24. The method of claim 22 wherein the optical identification code is distinct for each of the dies.

25. The method of claim 22 wherein the optical identification code and the electronic identification information include identical data. --

REMARKS

In the Office Action mailed August 21, 1998, the Examiner rejected claims 1-15 and 18 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,904,853, to *Yokokawa*. The Examiner rejected claims 16 and 17 under 35 U.S.C. § 103(a) as being unpatentable over *Yokokawa*. With this Amendment, the applicant amends claims 1-18 and adds new claims 19-25. The claim amendments are for purposes of clarifying the subject matter of the claims, and are not required to distinguish the claims over the cited prior art, as will be readily apparent from the discussion below. Upon entry of this Amendment, claims 1-25 are pending in this application.

Accompanying this Amendment is a supplemental information disclosure statement citing references first brought to the applicant's attention in an International Search Report for a related application. The applicant believes that the each of claims 1-25 are also patentable over these references. Also accompanying this Amendment are formal drawings for the Examiner's review and approval.

Technical Background of the Invention

Typically, a large number of identical integrated circuits are constructed on a single wafer of semiconductor material, with the portion of the wafer occupied by a single one of the circuits called a die. After completed fabrication, a series of tests is performed and test data is collected for each die. The test data is used in subsequent assembly/packaging steps to ensure that only properly functioning die are packaged as integrated circuit chips.

To correlate the various test results with the appropriate die or dies, accurate identification of each of the dies is required, both before and after packaging as an integrated circuit chip. Many of today's integrated circuits have electronically readable identification information that is programmed into the integrated circuit itself. Also, chip packages usually have ink- or laser-scribed marks that provide information such as date and country of manufacture, product and package types, speed and other test parameters, and manufacturing lot identification.

Information uniquely identifying the particular die within the chip is included only within the electronically readable identification information. Retrieving the electronically readable identification information usually requires special testing apparatus and necessarily requires physical contact to access the identifying information.

The Present Invention

The present invention is directed to an improved method and apparatus for identifying integrated circuits. The integrated circuits are both programmed with electronic identification information and marked with corresponding machine-readable optical identification code. The optical identification code may include the very same data as the electronic identification information or may instead be associated with the electronic identification information via a look-up table or other suitable correlating means. Both the integrated circuit dies and the encapsulated integrated circuit chips may be marked with machine-readable optical identification codes.

Conventionally, integrated circuits have included only the electronically accessible identification information, and perhaps also visual marking information intended for human eyes. Thus, accurate identification and tracking of individual integrated circuits has been available only during manufacturing processes in which the integrated circuit is electrically accessed. In contrast, the present invention additionally provides identification marks having machine-readable optical identification codes, thereby allowing convenient, accurate, and traceable identification of individual integrated circuits.

The *Yokokawa* Reference

Yokokawa describes what is commonly called a "SmartCard." The SmartCard of *Yokokawa* includes both a data storage area and a visual information area. The visual information area has one or more photographic slides that can be magnified and projected by a SmartCard reader. *Yokokawa* provides various examples of this visual information, such as a photograph or other pictorial representation of Hawaii, Diamond Head, Monument Valley, the Statue of Liberty, the SmartCard user's fingerprint, or user's signature. The visual information of *Yokokawa* is associated with the stored data in the sense only that the general subject matter is the same. For example, *Yokokawa* describes how a SmartCard reader would retrieve data stored in the SmartCard to produce descriptive text on a CRT display, while also displaying a corresponding picture (see, for example, Figure 9 showing display of a photographic slide of Monument Valley while the CRT display shows descriptive text concerning Monument Valley).

Plainly, *Yokokawa* has nothing to do with identification of integrated circuits. There is absolutely no discussion in *Yokokawa* of the various problems associated with integrated circuit identification either during or after die fabrication and packaged chip assembly. There is certainly no suggestion in *Yokokawa* of the particular solutions to those problems as claimed by the applicant.

There is no description in *Yokokawa* of the SmartCard having an integrated circuit with a particular region for storing *identification information* that *distinguishes the integrated circuit* from other substantially identical integrated circuits. There is also no description in *Yokokawa* that the visual information area on the SmartCard stores optical information that *identifies the integrated circuit* included within the SmartCard. What *Yokokawa* does describe is that if the SmartCard stores information concerning Hawaii, the visual information area can include a photographic slide showing a picture of a Hawaiian area of geographical interest.

Claims 1-6

Claim 1 has been amended to clarify the claimed subject matter—namely, distinguishing substantially identical integrated circuits from one another by using a combination of programmed electronic identification information and

associated optical identification code markings. The method includes "programming each of the integrated circuits with electronic identification information", and also "marking the integrated circuit with an optical identification code which corresponds with the electronic identification information." As described above, the disclosure of *Yokokawa* is wholly unrelated to the problem described and solved by the applicant—namely, distinguishing substantially identical integrated circuits.

In particular, *Yokokawa* does not include any discussion or suggestion of programming an integrated circuit in the SmartCard with electronic *identification information* that identifies the integrated circuit as distinct from others of the same integrated circuit. Also, *Yokokawa* does not include any discussion or suggestion that the visual information area of the SmartCard has *optical identification code* that corresponds with this electronic *identification information*. *Yokokawa* does not even discuss the problems identified by the applicant, much less suggest the particular solution claimed by the applicant, claim 1 is patentable over *Yokokawa*.

Claims 2-6 depend from claim 1, and recite additional claim limitations neither shown nor suggested by *Yokokawa*. For example, claim 2 recites "reading the optical identification code," and "associating the optical identification code with the corresponding electronic identification information." The applicant respectfully suggests that displaying a picture of Diamond Head along with descriptive text retrieved from the SmartCard data storage area has nothing to do with distinguishing amongst a plurality of substantially identical integrated circuits—much less by identifying integrated circuits by reading optical identification code and associating it with corresponding electronic identification information.

As a further example, claim 3 recites that associating the optical identification code with the corresponding electronic identification information includes accessing a look-up table. A look-up table is one way of associating two related sets of data, but not the only way. *Yokokawa* does not describe or suggest associating a picture of Monument Valley with descriptive text by using a look-up table! *Yokokawa* certainly cannot anticipate claim 3. Claims 4-6 recite further details about methods of identifying integrated circuits—a subject wholly absent from the discussion in *Yokokawa*. For these and other reasons, claims 2-6 are patentable over *Yokokawa*.

Claims 7-10

Claim 7 recites "a method of identifying integrated circuits," in which each integrated circuit has "a programmable circuit for storing electronically readable identification code which distinguishes the integrated circuits from one another." Claim 7 requires that each integrated circuit is marked with respective optical identification code, and that the optical identification code is then associated with the electronically readable identification code.

Yokokawa describes having pictorial slides associated with information stored in the SmartCard. There is no discussion that these pictorial slides constitute "optical identification code," or that the optical identification code is then associated with "electronically readable identification code." There is no discussion that the pictorial slides can be used to distinguish the integrated circuit included within the SmartCard from other integrated circuits included in other SmartCards. *Yokokawa* quite simply has nothing to do with identifying integrated circuits, and the subject matter of *Yokokawa* is wholly unrelated with the problems solved by the invention of claim 7. Therefore, claim 7 is patentable over *Yokokawa*.

Claims 8-10 depend from claim 7 and recite additional claim limitations neither shown nor suggested by *Yokokawa*. For reasons similar to those discussed above in connection with claims 2-6, among other reasons, claims 8-10 are also patentable over *Yokokawa*.

Claims 11-18

Claim 11 has been amended recite "a wafer comprising a plurality of dies," with "each die including an integrated circuit having a programmable identification circuit to store identification data ...." Each die also has "an optical identification mark positioned thereon and encoding information corresponding to the identification data." There is certainly no disclosure or suggestion in *Yokokawa* of marking individual dies on which integrated circuits are formed.

Claim 14 recites a plurality of integrated circuit chips, with each chip including an integrated circuit having "an identification circuit that stores identification data distinguishing each of the integrated circuit chips from one another." Each of the

chips also has "an optical mark ... encoding identification information corresponding to the identification data."

One of a number of clear distinctions between the claimed subject matter and *Yokokawa* is that the visual information provided by the *Yokokawa* SmartCard is quite separate from—not marked on—the integrated circuit included within the SmartCard. Further, as discussed above, the visual information provided by *Yokokawa* has nothing to do with particularly identifying or distinguishing that integrated circuit from other integrated circuits in other SmartCards or elsewhere. The disclosure of *Yokokawa* is simply not directed to the problems of identifying integrated circuit chips, or identifying the integrated circuits included within those chips, or identifying the dies on which those integrated circuits are formed. For reasons similar to those discussed above in connection with claims 1-10, claims 11-18 are clearly patentable over *Yokokawa*.

The disclosure of *Yokokawa* is simply unrelated to the problems of identifying a integrated circuits. *Yokokawa* does include an integrated circuit for storing information, such as information descriptive of Hawaii, Diamond Head, Monument Valley, the Statue of Liberty, etc. The SmartCard of *Yokokawa* also includes photographic slides that can be displayed to show corresponding pictures of Hawaii, Diamond Head, Monument Valley, and the Statue of Liberty. However, the stored information and pictures about these locales is wholly unrelated to particular identification of the one or more integrated circuits that may be included in the SmartCard of *Yokokawa*.

There is no discussion or suggestion in *Yokokawa* that the SmartCard integrated circuit includes an "identification circuit that stores identification data," as required by each of claims 11-18. There is also no discussion or suggestion in *Yokokawa* that the SmartCard photographic slides include an optical mark "encoding information corresponding to the identification data," as required by each of claims 11-18. There is no discussion or suggestion in *Yokokawa* of optical identification marks positioned on dies, as required by each of claims 11-13. There is no discussion or suggestion in *Yokokawa* of the identification data distinguishing integrated circuit chips from one another, as required by each of claims 14-18. Therefore, claims 11-18 are patentable over *Yokokawa*.

New Claims

New claims 19-25 have been added to recite additional details of the applicant's invention. For reasons similar to those discussed above, among other reasons, these claims are also patentable over *Yokokawa*.

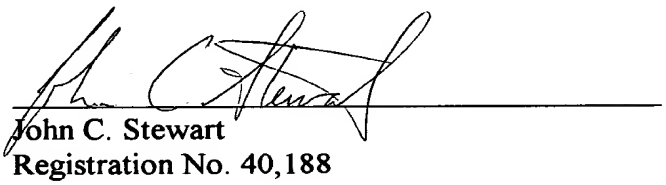
Conclusion

The *Yokokawa* reference applied by the Examiner is entirely unrelated to the problem of identifying integrated circuits. As demonstrated above, each of the claims pending in this application is patentable over *Yokokawa*. The applicant likewise believes that each of the claims is patentable over all of the prior art of record, including the art cited in the supplemental Information Disclosure Statement accompanying this Amendment. Therefore, the applicant respectfully requests a favorable reconsideration of his application and allowance of the pending claims.

Respectfully submitted,

Leland R. Nevill

SEED and BERRY LLP



John C. Stewart
Registration No. 40,188

JCS:jab

Enclosures:

Postcard
Form PTO-1083 (+ copy)
General Authorization
Filing Formal Drawings
1 Sheet of Formal Drawings (Figs. 1-3)
Supplemental Information Disclosure Statement
Form PTO-1449 (with 5 cited references)
International Search Report

6300 Columbia Center
701 Fifth Avenue
Seattle, Washington 98104-7092
(206) 622-4900
Fax: (206) 682-6031